THE *Bullettino* of the Italian Botanical Society is now published apart from the *Nuovo Giornale*. The first number contains reports of the papers read at the annual meeting, held at Naples in August, and of the regular meetings held since till the end of the year, and of the discussions which followed. Among the more noteworthy papers may be mentioned the following :—On a new carpellary theory, by Signor F. Pasquale, who maintains that the carpel is not derived, as has been generally supposed, from the modification of a single leaf, but from the concrescence of two, or sometimes of three leaves, which unite in the formation and nutrition of the ovules and seeds.—On the floral structure and process of pollination in some species of *Nigella*, by Dr. A. Terracciano.—On the period of formation of the inflorescence within the bud of the vine, by Signor U. Martelli.—On the non-sexual propagation of *Cynomorium coccineum*, by the same writer, who has established its parasitism on *Atriplex nummularia*.—Prof. G. Arcangeli also describes the results of experiments on the cultivation of this plant, which he finds to be parasitic on many hosts.—On earthquakes and vegetation, by Signor A. Goiran. He finds the effects of seismic motions in the earth to be the more rapid germination of seeds, as well as a more rapid growth of the young plant.—Signor E. Tanfani has a paper on the teaching of botany in gymnasia, which he considers to be in a very backward state in Italy.

THE *Botanical Gazette* for January contains two interesting original papers :—Herr A. F. Foerste speaks of the relationship of autumn- to spring-blossoming plants, and concludes that late autumn-flowering plants may be divided into two classes—those which have developed from summer-flowering plants by the increase in the number of internodes with their appendages and the gradual retardation of growth, and those which have developed from spring-blossoming plants by the premature development of buds destined to flower during the ensuing spring.—Mr. H. L. Russell discourses on the effect of mechanical movement on the growth of certain plants. The experiments were made chiefly on certain yeast-fungi ; and the general results were that the development of filaments was hindered by shaking ; but that strong agitation greatly increases the activity of cell-division, while it diminishes the intensity of fermentation. This may be compared with the fact mentioned above relative to the effect of earthquakes on the growth of plants.

THE greater part of the number of the *Nuovo Giornale Botanico Italiano* for January is occupied by a paper by Signor A. Jatta, on the Lichens of Italy, accompanied by a very elaborate bibliography.—Signor C. Massolongo has a note on a floral monstrosity in *Jasminum grandiflorum ;* and Dr. R. Cobelli a paper on the movements of the flower and fruit of *Erodium gruinum*. These movements belong to three organs—the calyx, the upper portion of the style, and the mericarp—and do not appear to be in any way connected with the pollination of the flower, since the species is apparently self-fertilized, and no pollinating insects were observed at any time upon it.

SOCIETIES AND ACADEMIES.

LONDON.

Physical Society, February 26.—Prof. W. E. Ayrton, F.R.S., Past President, in the chair.—Prof. S. P. Thompson, F.R.S., read a paper on modes of representing electromotive forces and currents in diagrams. The author said he had found it advantageous in some cases to depart from the usual methods of representation, and he now brought the subject before the Society in order to have it discussed and improvements suggested. To indicate the directions of currents in wires seen end-on, Mr. Swinburne had used circles with and without crosses, but no symbol had been suggested for wires not conveying currents. He (Prof. Thompson) thought the plain circle should be used for inactive wires. A circle with a dot in the middle could then be used to indicate that a current was flowing towards the observer, and a circle with a cross in it to represent a wire conveying a current away. These meanings could be recalled by considering the direction indicated by an arrow, the dot showing the tip of the arrow, and the cross the feathers. Some method of distinguishing between E.M.F. and current was required. For this he proposed to use thin-stemmed arrows with feathers for E.M.F.'s, and thick-stemmed ones without tails for currents. In the case of electrical transmission of energy, this convention had the important advantage that where the two arrows had the same direction, energy was being given to the system, and where the arrows were opposite, energy was leaving it. Mr. Maycock, he said, had recently published a simple rule for finding the direction of magnetic force due to a current of known direction in a wire. Grasp the wire with the right hand, the thumb pointing in the direction of the current ; the fingers will then encircle the wire in the direction of the magnetic force. Dr. Fleming's well-known rule for induced currents was also a *right-hand* rule, but as it referred to the direction of *currents*, another rule was necessary when considering motors. By making the rule refer to E.M.F.'s, only one rule was required for generators and motors. For alternating currents the author found it convenient to draw polar curves analogous to Zeuner's valve diagrams. Suppose a line OP (Fig. 1), representing the maximum value of an E.M.F. or current whose magnitude is a sine function of the time, to revolve at uniform velocity about O ; the intercepts OQ, OQ′, &c., cut off by circles OQB, OQ′D, will represent the magnitudes at the times corresponding to the positions OP and OP′. The effect of lag can also be represented in such diagrams. In cases where the variables are not sine functions, the curves OQB and OQ′D are no longer circles. Polar diagrams representing the E.M.F. and current curves obtained by Prof. Ryan in his transformer experiments were exhibited, and a working diagram, illustrating the changes in three-phase currents, was shown. To show the directions of induced E.M.F.'s in diagrams of dynamos and motors, diagonal shading of the pole-faces was sometimes convenient ; the lines over north poles being drawn from left to right downwards in the direction of the middle stroke of the letter N, and those over south poles from left to right upwards. A conductor passing over a north pole from left to right would have an E.M.F. induced in a downward direction, as indicated by the slope of the diagonal lines. This method of representation was used to show the ways of connecting up multipolar drum armatures, the winding being supposed cut along a generating line, unwrapped from the core, and laid out flat in the manner adopted by Fritsche. In connection with armatures, the author said a formula had been published by means of which the nature of a winding consisting of a given number of convolutions, and to be used with a given number of poles, could be predetermined. This, he thought, would be very useful in practice. Mr. Blakesley said the old method of representing alternate current magnitudes by means of the projections of revolving lines, seemed preferable, for it left no ambiguity as to the directions of the quantities. The method of shading the poles also required that the direction in which the diagram was to be viewed should be known before the direction of the E.M.F. could be determined. Mr. Swinburne suggested that the author might use a bow to represent E.M.F., and an arrow for current. He was glad to see that Prof. Thompson recognized the differences in dynamos and motors, and approved of the view that mnemonic rules should refer to E.M.F. and not to current. The diagrams of drum windings would be very useful, and he hoped the author would make the subject clear to ordinary workmen in the next edition of "Dynamo-Electric Machinery." Prof. Perry considered it undesirable to use polar curves for anything but circles. In his opinion it was not sufficiently known that any curve can be split up into a series of sine curves, and each component dealt with separately ; the separate results being added together in the end. Mr. Swinburne pointed out that before one could analyze a curve in this way, the curve must be known, and would probably have to be determined ex-

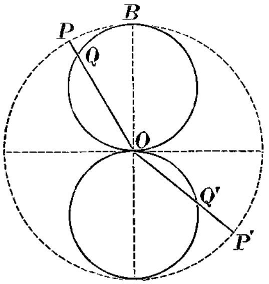

FIG. 1.

perimentally. If means for finding one curve are available, any other required curve could probably be found by the same apparatus; hence there was no need for analysis. Prof. Perry remarked that experiments could not be made on a machine before the machine was built; whereas the E.M.F. curve could be predetermined from its design. By analysis, its current curves, when working under various conditions, could be found. Prof. Ayrton, referring to the mnemonic character of the modes of representation described by Dr. Thompson, suggested that the symbols in the author's book should be more mnemonic. He himself was in the habit of using large letters for currents and small ones for resistances: A and a for the armature, S and s for series, and Z and z for the shunt, currents and resistances, respectively, and σ and ζ for the series and shunt turns. He also found the following "electromotive force" rule very convenient. Draw three rectangular axes, OM, OF, and OE, as shown in Fig. 2. If, then, OF represents the direction of the force (magnetic), OM that of the motion, then OE shows the direction of the induced E.M.F. Dr. Thompson, in replying, said he thought Mr. Blakesley had misunderstood what had been said, for no ambiguity existed. In describing the windings of armatures, difficulty arose from want of proper names for the various elements, and in his forthcoming work suitable names had been given. To Prof. Ayrton he pointed out that in his book he (Dr. Thompson) had used mnemonic characters, for r_a, r_s, and r_m represented the resistances of armature, shunt, and series magnet coils respectively. The symbol I for current had also been recommended for adoption by the Frankfort Committee. He objected to Greek letters except for specific quantities, such as angles, specific inductive capacities, refractive indices, &c. He appreciated the simplicity of Prof. Ayrton's E.M.F. rule, but thought it would be better to rotate OE and OF through a right angle about OM, thus giving Fig. 3.—A paper on the flexure of long pillars under their own weight, by Prof. M. Fitzgerald, was read by Mr. Blakesley. The subject of upright pillars fixed at the base and free at the top is treated mathematically, the differential equation being integrated in two series, involving ascending powers of the variable. Putting L for the ratio of length to diameter, the results, when applied to thin steel tubes and rods, for which Young's modulus is taken as 12,000 tons per square inch, show that the limiting height (in feet) of pillars which can stand without bending is given by $H = \frac{15 \times 10^6}{L^2}$ for tubes; and $H = \frac{7{\cdot}5 \times 10^6}{L^2}$ for rods. If $L = 100$, the maximum height of a tube is 1500 feet, the diameter being 15 feet. For wires, L may have larger values, and the limiting length of a No. 28 B.W.A. steel wire, is about 10 feet. In the case of pillars whose neutral axes are constrained to be vertical both at top and bottom, the results show that a definite ratio must exist between the bending moments producing the constraints.—A paper on choking coils, by Prof. Perry, F.R.S., and a description of the uses of Rice's choking coils for regulating the brilliancy of incandescent lamps, by Mr. Hammer, were postponed until next meeting.

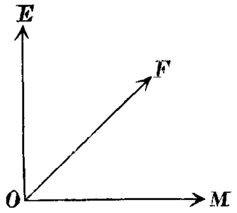

FIG. 2.

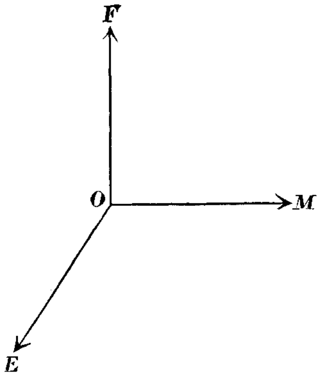

FIG. 3.

Linnean Society, March 3.—Prof. Stewart, President, in the chair.—A letter was read from the Home Secretary, conveying the thanks of Her Majesty the Queen for the address of condolence which had been forwarded on behalf of the Society on the death of H.R.H. the Duke of Clarence and Avondale.—The President announced the presentation by Sir Joseph Hooker to the Society of two medallion portraits of Sir James Ross and Dr. John Richardson, whose names are well known in connection with Arctic exploration. The medallions were executed in 1843 by the late Bernhard Smith. A vote of thanks to the donor was passed unanimously.—Mr. Clement Reid exhibited a collection of fossil plants and seeds which he had found associated with the bones of Rhinoceros and other mammals in the neighbourhood of Selsea, and West Wittering. By means of diagrams Mr. Reid showed the exact position of the bed, and described the condition in which the various specimens were deposited.—On behalf of Mr. W. E. Beckwith, of Shrewsbury, Mr. H. Seebohm exhibited a specimen of White's Thrush (*Turdus varius*) which had been shot near Shrewsbury on January 14 last. He pointed out that this species, which inhabits Eastern Asia, belongs to the sub-genus *Oreocincla*, an exclusively Eastern group of ground Thrushes, and is the only one which is Palæarctic and migratory. It does not breed anywhere west of the Yenisei, and its occurrence in Europe is accidental. Mr. Seebohm added that it had been met with twice in France, four times in Italy, three times in Belgium, once or twice in Austria and Prussia, once in Norway, thirteen times in Heligoland (between 1827 and 1884), and about a score of times in the British Islands, including three occurrences in Ireland, and one in the extreme south of Scotland.—On behalf of Mr. A. Craig Christie, the Secretary exhibited some specimens, as was supposed, of *Lycopodium complanatum*, collected in Scotland, on which it was suggested that the plant might be regarded as British. In the opinion, however, of Mr. James Groves, who had carefully examined the specimens, and other botanists present, they were referable to *L. alpinum*. Mr. Groves pointed out the distinctive characters of both. Mr. Carruthers was of opinion that *L. complanatum* had been met with in the south of England, but not within the last ten years. Mr. E. M. Holmes was under the impression he had seen it growing a few years ago near Stroud.—A paper was then read by Mr. A. D. Michael, on variations in the internal anatomy, and especially the genital organs, of the *Gamasinæ*, a typical sub-family of the Acari. In this paper the author gave the results of two years' research, including many hundreds of dissections and serial sections, with lengthy observations of the living creatures. The comparison of variable organs was worked out in numerous species, showing great specific differences. Four of the species were found to be previously undescribed, and for these the names *Hæmogamasus horridus*, *H. nidi*, *Lælaps oribatoides*, and *L. ligoniformis* were proposed.

Royal Microscopical Society, February 17.—Dr. R. Braithwaite, President, in the chair.—Prof. F. Jeffrey Bell said that he had, in accordance with the resolution passed at the last meeting, forwarded a copy of the message of condolence from the Society to the Prince of Wales, to General Sir Dighton Probyn, and he had received the following letter of acknowledgment:—"*Sandringham, Norfolk.*—General Sir Dighton Probyn, Comptroller and Treasurer of the Household, is desired to convey to the members of the 'Royal Microscopical Society' the heartfelt thanks of the Prince and Princess of Wales for the Society's kind resolution, expressing sympathy for their Royal Highnesses in their deep affliction.—*January* 25, 1891."—Mr. Watson exhibited and described a new vertical camera for photomicrography designed upon the same lines as that used by Dr. Van Heurck.—The President then read his annual address, postponed from the last meeting under the special circumstances then mentioned. The subject chosen was the impregnation and modes of reproduction in Ferns and Mosses; diagrams in illustration were exhibited and explained, and specimens were also shown under microscopes.—A cordial vote of thanks, proposed by the Rev. Canon Carr and seconded by Prof. Groves, was given to the President for his valuable address.—Mr. J. J. Vezey moved that the best thanks of the Society be given to its officers, and also to the auditors and scrutineers for their services during the year.—The President declared the motion to be carried by acclamation.—Prof. Bell thanked the Society on behalf of himself and the other officers, at the same time calling attention to the special services rendered by the Treasurer, Mr. Frank Crisp.—The following are the names of the members of the new Council, who met for the first time at this meeting:—President: Dr. R. Braithwaite. Vice-Presidents: Mr. A. W. Bennett, Prof. J. W. Groves, Mr. G. C. Karop, and Mr. A. D. Michael. Treasurer: Mr. Frank Crisp. Secretaries: Prof. F. Jeffrey Bell and the Rev. Dr. W. H. Dallinger. Ordinary members: Dr. Lionel S. Beale, Rev. E. Carr, Mr. James Glaisher, Dr. R. G. Hebb, Mr. E. M. Nelson, Mr. T. H. Powell, Prof. Urban Pritchard, Mr. W. W. Reeves, Prof. C. Stewart, Mr. W. T. Suffolk, Mr. C. Tyler, and Mr. F. H. Ward.

Paris.

Academy of Sciences, March 7.—M. d'Abbadie in the chair.—Fermentation of blood, by MM. Berthelot and G. André. The blood of cattle, defibrinated, was fermented for 130 days in a water-bath at 35°. The paper contains an account of the products of the fermentation. It will be published in greater detail in the *Annales de Chimie et de Physique*.—On the distribution in latitude of solar phenomena observed at the Royal Observatory of the Roman College during the second half of 1891, by M. P. Tacchini. (See Our Astronomical Column.)—Phenomena observed at Kalocsa, on the large group of spots of February 1892, by M. J. Fényi. A prominence, 124″ high, was observed in the position 220°–230°, as the recent large spot-group was crossing the limb.—On the impossibility of certain movements, by MM. A. de Saint-Germain and L. Lecornu.—On the movement of a conical pendulum, by M. de Sparre.—On electro-capillary phenomena, by M. Alphonse Berget.—On the co-existence of dielectric power and electrolytic conductivity, by M. E. Bouty. It appears from the experiments described that the dielectric constant only varies slightly under conditions which produce an enormous increase of conductivity. Thus, water and ice have sensibly the same dielectric constant, whilst the conductivity may vary from 1 to 10^5 or 10^6.—On the thermal conductivity of crystalline bodies, by M. Charles Soret.—Rule for finding the number and nature of accidentals of the gamut in a tone and a given mode, by M. Pierre Lefebvre.—On the density of aqueous solutions, by M. Georges Charpy. The author concludes from his results that the variation of the density of a solution, as a function of the concentration, is a complex phenomenon, and cannot be used in studying the state of the dissolved body. There is no reason why the solution at which the maximum density is reached should be regarded as corresponding to a definite hydrate.—Compounds of gaseous ammonia with boron iodide and bromide, by M. A. Besson.—Synthesis of the minerals crocoisite and phœnicite (*phœnicochroïte*), by M. C. Luedeking.—On the value of the primary alcoholic function, by M. de Forcrand.—On the production of quinine di-iodomethoxide from cupreïne, by MM. E. Grimaux and A. Arnaud.—A study of the velocity of decomposition of diazo-compounds by water, by MM. P. Th. Muller and J. Hausser. The law according to which sulphanilic acid is decomposed is expressed by the formula $C = \frac{1}{\theta} \log. \text{nat.} \frac{A}{A - x}$, in which θ is the time, C a constant, A the total nitrogen that can be evolved, and x the amount of nitrogen evolved. C is independent of the concentration.—Action of capryl iodide on trimethylamine in aqueous solution, in equimolecular proportions; formation, when heated, of dimethylcaprylamine; production in the cold of caprylene, by MM. H. and A. Malbot.—New synthesis of tartaric acid, by M. P. Genvresse. (See Notes.)—On the pyloric secretion of the dog, by M. Ch. Contejean.—New rings or intercalary rings of nerve-ducts (*tubes nerveux*), produced by the impregnation of silver, by M. Benjamin Ségall.—On two new species of *Streptothrix*, Cohn, and on the place of this genus in the classification, by MM. C. Sauvageau and M. Radais.—History of the *Garcinia* of the sub-group *Xanthochymus*, by M. J. Vesque.—On the magnetic disturbance and the aurora borealis of March 6, 1892, by M. Th. Moureaux. Disturbances similar to those of February 13–14, but less violent, were registered by the Parc Saint-Maur instruments on March 6–7.—On the magnetic storm of February 13–14, by M. H. Wild. A comparison of the records made by instruments at Pawlowsk with those obtained at Parc Saint-Maur shows that, although the recent magnetic storm commenced at approximately the same time, the variations at the two places were in the opposite directions. Other differences have been observed in the two records.—On the atmospheric, magnetic, and seismic disturbances of February 1892, by M. Ch. V. Zenger. The author has marshalled facts to show that magnetic storms, cyclones, snow-storms, discharges of atmospheric electricity, earthquakes, and volcanic eruptions occur simultaneously.—On three fossil human skeletons found in the Baousse-Roussé grottos, in Italy, by M. Émile Rivière.

BOOKS RECEIVED.

Books.—Phases of Animal Life: R. Lydekker (Longmans).—Meteorological Observations made at the Adelaide Observatory, &c., during the Year 1889 (Adelaide).—The Rationale of Mesmerism: A. P. Sinnett (Kegan Paul).—Zoological Record, 1890 (Gurney and Jackson).—Elements of Economics of Industry: Prof. A. Marshall (Macmillan).—Elementary Mathematical Astronomy: C. W. C. Barlow and G. H. Bryan (Clive).—The Dietetic Value of Bread: J. Goodfellow (Macmillan).—Air and Water: Prof. V. B. Lewes (Methuen).—Le Climat de la Belgique, 1891: A. Lancaster (Bruxelles, Hayez).—Soils and Manures: Dr. J. M. H. Munro (Cassell).—Longmans' School Geography for North America: G. G. Chisholm and C. H. Leete, 2nd edition (Longmans).—Precious Stones and Gems: E. W. Streeter, 5th edition (Bell).—The Oak: Prof. H. M. Ward (Kegan Paul).—The Labrador Coast: Dr. A. S. Packard (Kegan Paul).—Contribution à l'Étude de la Morphologie et du Developpement des Bactériacées: A. Billet (Dulau).—Bateaux et Navires: Marquis de Folin (Paris, Baillière).—Diseases of the Nose: Dr. G. Macdonald, 2nd edition (Watt).—Annals of the Royal Botanic Garden, Calcutta, vol. iii. (Calcutta).—A Short Text-book of Inorganic Chemistry: Dr. H. Kolbe, translated and edited by Dr. T. S. Humpidge, 3rd edition (Longmans).—Laboratory Practice: Dr. J. P. Cooke (Kegan Paul).—Catalogue of the Specimens illustrating the Osteology of Vertebrated Animals recent and extinct, contained in the Museum of the Royal College of Surgeons of England, Part 3, Class Aves: Dr. R. B. Sharpe (Taylor and Francis).

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